http://www.sciencebob.com/graphics/titles/build-a-fizz-inflator.png



**INTRODUCTION**

Baking soda and vinegar are two common materials found in almost every household. That, plus the fact that all the starting and finishing materials are non hazardous and safe, is why this is one of the first chemical reactions that many people are exposed to.  
  
In fact, this baking soda and vinegar reaction has been widely used from public school science classes’ right up to the university level courses to analyze and demonstrate chemical reactions.

**Make a Baking Soda and Vinegar Explosion**

With this fun experiment, you will explore the explosive chemical interaction that takes place between the acid (acetic acid) in vinegar and the base (sodium bicarbonate) in baking soda. This experiment should be done outdoors to avoid causing a mess or potential damage indoors.

The chemist in you is probably very curious about how different materials interact. Whether they are liquids, solids, or gases, most materials react with other materials. For example, you may have seen a marble statue damaged by air pollution. Sulfur dioxide (SO2) emissions from coal-fired power plants results in SO2-laden rain, or acid rain, which reacts with the calcite in marble and results in erosion of the marble. While it’s not as dramatic as a vinegar and baking soda reaction, this provides an example of how various materials all around us are interacting. What other materials can you think of that interact in surprising ways?

**Purpose**

Chemical change is the key word in this experiment. Reactants (the original substances that react to each other) are changed during the chemical reaction process, so the end result (the product) is a substance that is different from the two reactants. In fact, sometimes they are very different!

But why are chemical reactions important? These processes are taking place all around us all of the time, inside of our body, in our environment, in food processing – virtually everywhere. It is very important that we understand chemical interactions so that we, as a society, can make informed choices about medical care, environmental impact, food safety, and many other aspects.

**Activity**

This activity is a great way to safely experiment with chemical reactions. In this activity, you will combine two reactants (vinegar and baking soda) in a small vessel which will cause a strong bubbling or fizzing interaction and result in a non-hazardous product called sodium acetate and water. The fizzing action is the result of carbon dioxide escaping.  This happens to be the same gas that you exhale and that same gas that plants use for photosynthesis. Do you think if you did this experiment under a tree, it would affect the tree at all? Typically a small plastic food container or a 35mm plastic film canister (these are not as easily to find since most people use digital cameras now, but you can ask your parents, they were alive in the age when 35mm camera were still very common and they might have a few canisters laying around). In a pinch, you can do the experiment in a zipper lunch baggie. You will also need a clear workspace.



* One small empty plastic soda or water bottle
* 1/2 cup of vinegar
* Small balloon
* Baking soda
* Funnel or piece of paper

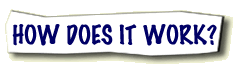
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| http://library.thinkquest.org/3347/pictures/glass.JPG | You will need Safety Glasses! |
| http://library.thinkquest.org/3347/pictures/jar.JPG | Two jars, or other transparent containers, |
| http://library.thinkquest.org/3347/pictures/spoon.JPG | A spoon, |
| http://library.thinkquest.org/3347/pictures/vinegar.JPG | Vinegar, |
| http://library.thinkquest.org/3347/pictures/bakesoda.JPG | Baking Soda, |
| http://library.thinkquest.org/3347/pictures/towel2.JPG | Bring paper towels to clean up any spills. |



**1.** Carefully pour the vinegar into the bottle.   
  
**2.** This is the tricky part: Loosen up the balloon by stretching it a few times and then use the funnel to fill it a bit more than half way with baking soda. If you don't have a funnel you can make one using the paper and some tape.   
  
**3.** Now carefully put the neck of the balloon all the way over the neck of the bottle without letting any baking soda into the bottle.



**4.** Ready? Lift the balloon up so that the baking soda falls from the balloon into the bottle and mixes with the vinegar. Watch the fizz-inflator at work!

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The baking soda and the vinegar create an ACID-BASE reaction and the two chemicals work together to create a gas, (carbon dioxide) Gasses need a lot of room to spread out and the carbon dioxide starts to fill the bottle, and then moves into the balloon to inflate it.

  
The project above is a **DEMONSTRATION**. To make it a true experiment, you can try to answer these questions:

**1.** Does water temperature affect how fast the balloon fills up?  
**2.** Does the size of the bottle affect how much the balloon fills?  
**3.** Can the amount the balloon fills-up be controlled by the amount of vinegar or baking soda?